Report of the National Marine Fisheries Service for the Calendar Year 1973

July 1974

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Report of the National Marine Fisheries Service For the Calendar Year 1973

July 1974

UNITED STATES
DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
Robert M. White, Administrator

National Marine
Fisheries Service
Robert W. Schoning, Director

THE SECRETARY OF COMMERCE
Washington, D.C. 20230

President of the Senate
Speaker of the House of Representatives

Sirs:

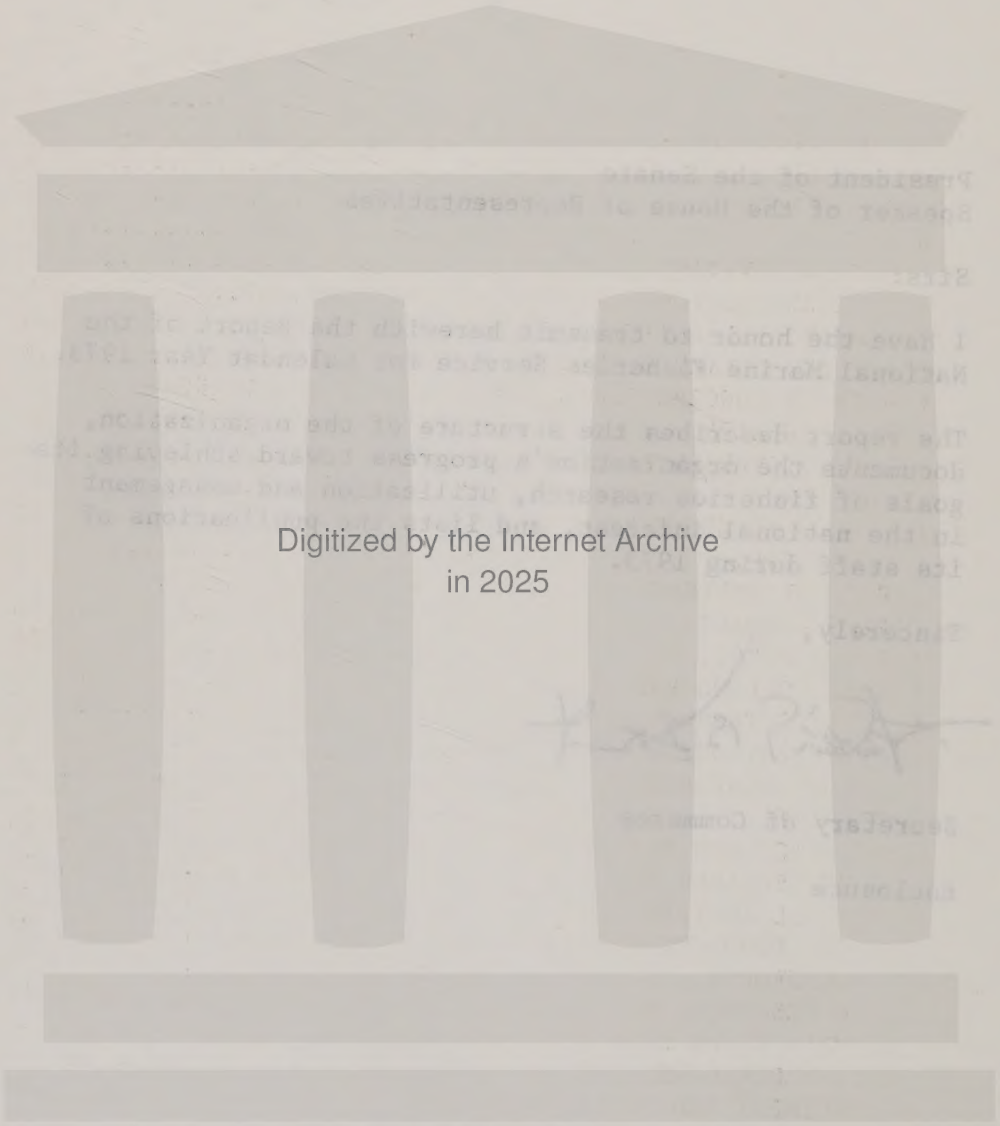
I have the honor to transmit herewith the Report of the National Marine Fisheries Service for Calendar Year 1973.

The report describes the structure of the organization, documents the organization's progress toward achieving its goals of fisheries research, utilization and management in the national interest, and lists the publications of its staff during 1973.

Sincerely,

Secretary of Commerce

Enclosure



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INTRODUCTION

This report is submitted in response to the requirement of Section 9(a) of the Fish and Wildlife Act of 1956, as amended 16 U.S.C. 742h(a). It covers calendar year 1973.

The report which follows will describe the state of the U.S. fisheries in calendar year 1973, cover the present organization of the National Marine Fisheries Service (NMFS), cite significant developments, and list the publications which have resulted from its functions during that year.

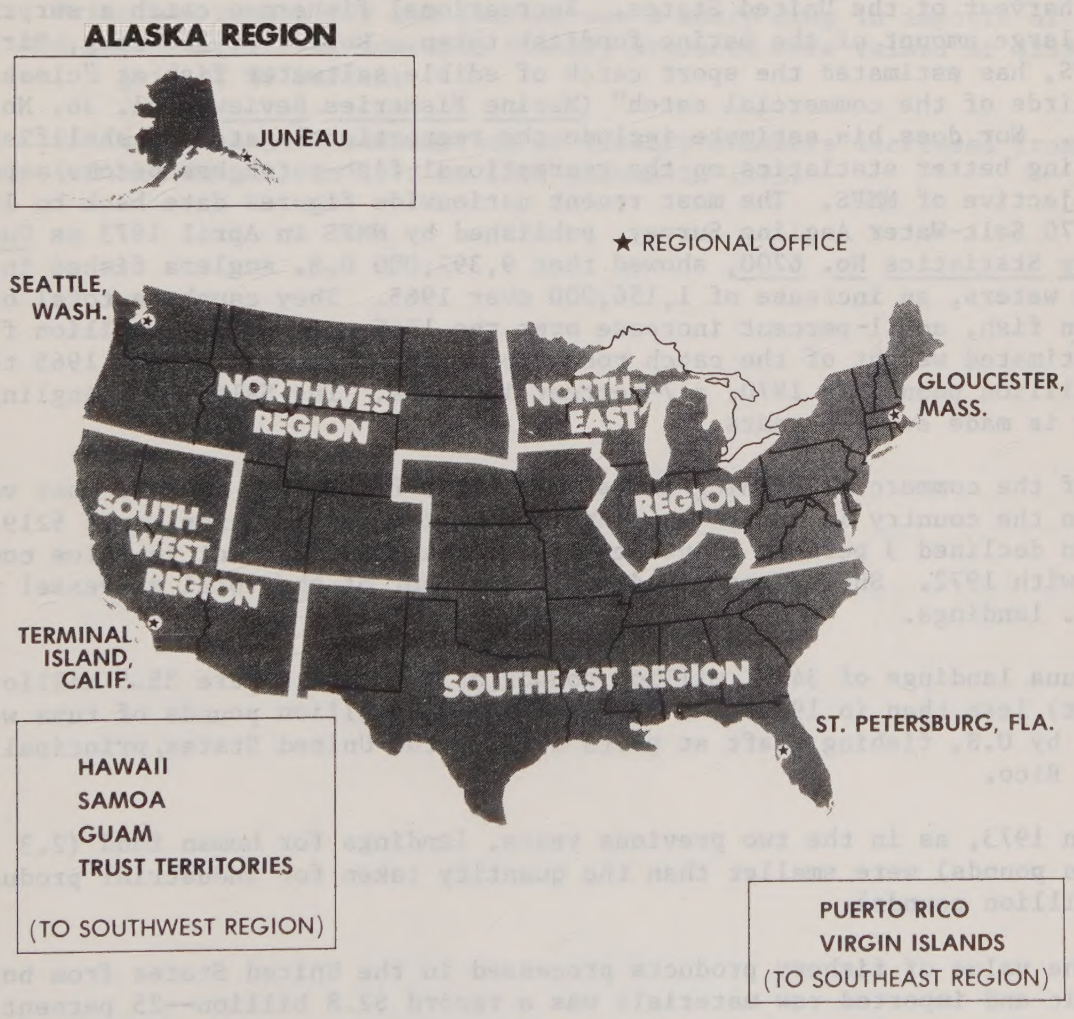

FIGURE 1.—Regions of the National Marine Fisheries Service.

In 1973, the U.S. commercial harvest of fish, shellfish, and other aquatic life was 4.7 billion pounds worth a record $907.4 million to the fishermen. The landings increased slightly compared with 1972, and value increased 29 percent--principally because of higher ex-vessel prices. The average value in 1973 was a record 19.2 cents per pound. The slight gain in landings was caused principally by record harvests of anchovies, Pacific shrimp, surf clam meats, and snow crabs. Increased landings of bonito, Atlantic cod, croaker, Pacific sea herring, striped bass, pollock, rockfishes, scup, and whiting also contributed to the greater volume. Sharp declines occurred, however, in landings of flounders (principally yellowtail and Pacific); Atlantic sea herring; jack mackerel; albacore, bluefin, and skipjack tuna; pink salmon; hard blue crabs; Dungeness crabs; Gulf shrimp; and squid. Slighter decreases occurred in landings of haddock, Pacific halibut, menhaden, red salmon, and oysters.

Commercial fish landings fall far short of depicting the true annual ocean harvest of the United States. Recreational fishermen catch a surprisingly large amount of the marine foodfish taken. Robert W. Schoning, Director of NMFS, has estimated the sport catch of edible saltwater fish at "close to two-thirds of the commercial catch" (Marine Fisheries Review, Vol. 36, No. 10, p. 36). Nor does his estimate include the recreational catch of shellfish. Obtaining better statistics on the recreational fish catch has become a pressing objective of NMFS. The most recent nationwide figures date back to 1970. The 1970 Salt-Water Angling Survey, published by NMFS in April 1973 as Current Fishery Statistics No. 6200, showed that 9,392,000 U.S. anglers fished in marine waters, an increase of 1,156,000 over 1965. They caught a total of 817 million fish, an 11-percent increase over the 1965 catch of 737 million fish. The estimated weight of the catch rose from 1.47 billion pounds in 1965 to 1.58 billion pounds in 1970, a 7-percent increase. The Salt-Water Angling Survey is made every 5 years.

Of the commercial fishing industries, that for shrimp was the most valuable in the country in 1973. Landings of 372.2 million pounds worth $219.4 million declined 3 percent in volume, but increased 14 percent in value compared with 1972. Shrimp accounted for 24 percent of the total ex-vessel value of U.S. landings.

Tuna landings of 342.1 million pounds at U.S. ports were 35.5 million (9 percent) less than in 1972. An additional 173.5 million pounds of tuna were landed by U.S. fishing craft at ports outside the United States, principally in Puerto Rico.

In 1973, as in the two previous years, landings for human food (2.3 billion pounds) were smaller than the quantity taken for industrial products (2.4 billion pounds).

The value of fishery products processed in the United States from both domestic and imported raw materials was a record $2.8 billion--25 percent more than in 1972, the former record year. Packaged fresh and frozen products were 48 percent of the total value; canned, 42 percent; industrial, 7 percent; and cured, 3 percent.

Processors of fishery products had a generally successful year. Compared with 1972, production of fresh and frozen packaged fish fillets and steaks (129.9 million pounds) increased 3 percent; fish sticks and portions (423.0 million pounds), 10 percent; and breaded shrimp (109.4 million pounds), 2 percent. The pack of canned fishery products was a record 1.6 billion pounds worth a record $1.2 billion--a gain of 2 percent in volume and 18 percent in value compared with 1972. Record packs of tuna, shrimp, clam products, and animal (pet) food contributed substantially to the increases. Industrial fishery products were valued at $201.1 million--29 percent more than in 1972. Sharp increases in prices of fish meal and oil accounted largely for the gain. Cold storage holdings of frozen fishery products reached an alltime high of 459.4 million pounds on December 31, 1973.

Imports of fishery products were worth a record $1,579 million--an increase of 6 percent compared with 1972, the former record year. Imports of edible fishery products were 2.4 billion pounds worth $1.4 billion--2 percent more in quantity and 13 percent more in value than in 1972. The value of imports of nonedible fishery products ($184.6 million) declined 29 percent compared with 1972. Principal reason for the decline was a sharp drop in imports of fish meal and oil. Exports of domestic fishery products were valued at $299.2 million, a gain of 89 percent.

Civilian per capita consumption of fishery products increased from 12.3 pounds (edible weight) in 1972 to 12.6 pounds in 1973.

ORGANIZATION

The major aspects of the 1973 NMFS organization were:

(1) The primary functions of NMFS have been assigned among three areas, those concerned with Resource Research, Resource Utilization, and Resource Management. Each is headed by an Associate Director.

(2) Within the Office of Resource Research, there are five major fisheries research centers concerned primarily with high-seas research carried out as part of nationwide programs designed to solve problems of national or international nature. The headquarters or lead laboratories of these centers are located in Seattle, Wash., for the Northwest Fisheries Center; La Jolla, Calif., for the Southwest Fisheries Center; Woods Hole, Mass., for the Northeast Fisheries Center; Beaufort, N.C., for the Atlantic Estuarine Fisheries Center; and Miami, Fla., for the Southeast Fisheries Center. Directors of these centers, who report administratively to the Associate Director for Resource Research, also serve as senior scientific advisors to the Regional Directors.

(3) The Regional Directors act as the key NMFS representatives in their geographical area of responsibility. There are five regional offices, whose Directors report to the Director of NMFS. Figure 1 illustrates the geographical area and headquarters office for each region. These regional offices with their centers and laboratories are concerned chiefly with the inshore and estuarine research, and with programs and problems that tend to be regional in nature. The regional centers and laboratories are the Gulf Coastal Fisheries Center located at Galveston, Tex.; the Middle Atlantic Coastal Fisheries Center at Sandy Hook, N.J.; Tiburon Fisheries Laboratory in California; and the Auke Bay Fisheries Laboratory in Alaska.

(4) The fishery products technological centers and laboratory are under the Associate Director for Resource Utilization. These facilities are located at Gloucester, Mass.; Seattle, Wash.; and College Park, Md.

The NMFS organization structure is shown in Figure 2.

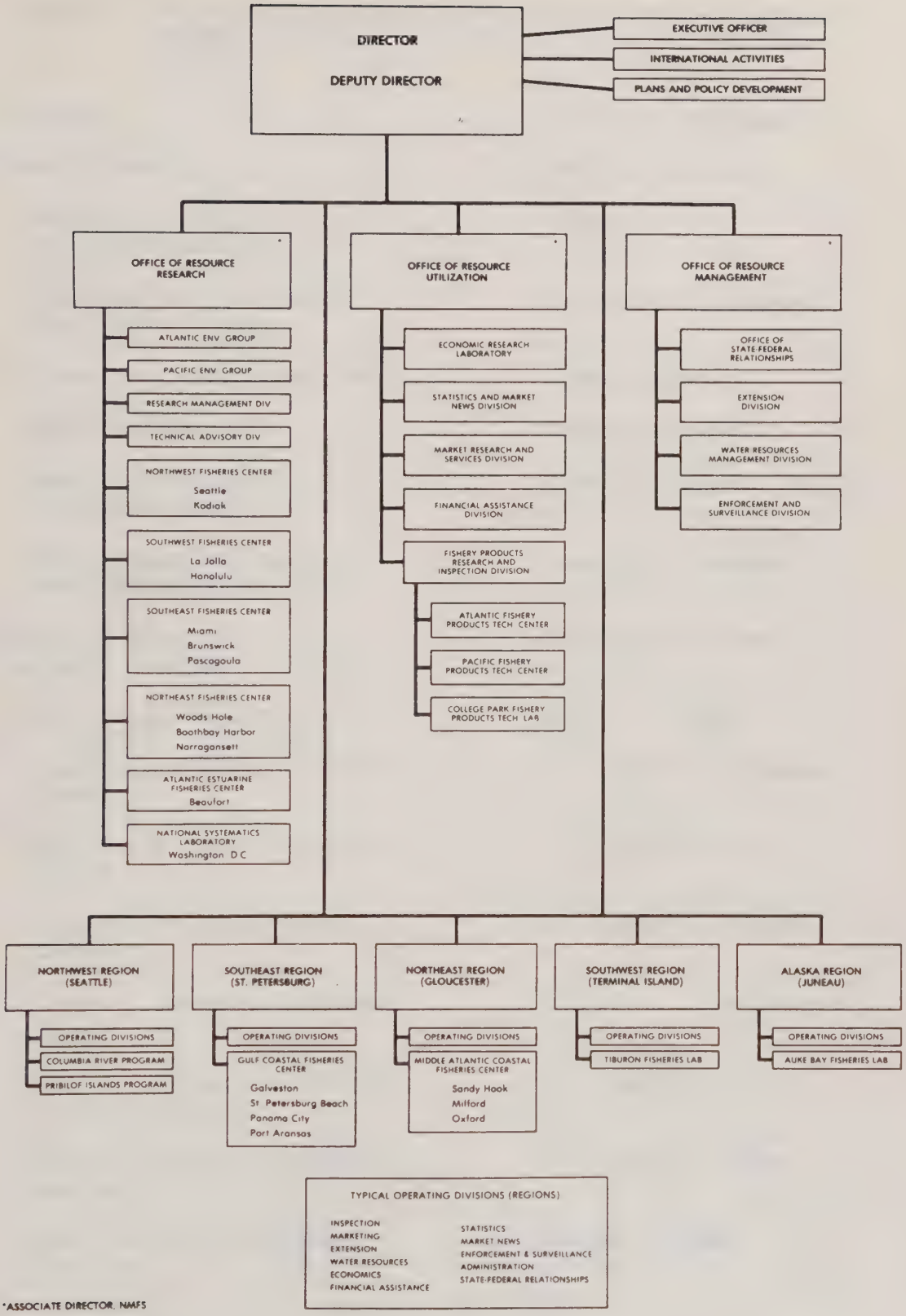

Figure 2.—Organization structure of the National Marine Fisheries Service.

Table 1.--Principal Officials of the National Marine Fisheries Service, December 31, 1973.

Director	Robert W. Schoning
Deputy Director	Jack W. Gehringer
Assistant to the Director for Sport Fisheries	Vacant
Assistant to the Director for Special Projects	Dr. Steven E. Schanes
Scientific Publications Staff	Thomas A. Manar
Executive Officer	Robert K. Crowell
Chief, International Activities Staff	Carmen J. Blondin (Acting)
Chief, Plans and Policy Development Staff	Kenneth R. Goodwin
Associate Director for Resource Research	Dr. William F. Royce
Deputy Associate Director	Dr. A. K. Sparks
Director, Northwest Fisheries Center	Dr. Dayton L. Alverson
Director, Southeast Fisheries Center	H. R. Bullis, Jr.
Director, Northeast Fisheries Center	Dr. Robert L. Edwards
Director, Southwest Fisheries Center	Dr. Brian J. Rothschild
Director, Atlantic Estuarine Fisheries Center	Dr. Theodore R. Rice
Director, National Systematics Laboratory	Dr. Daniel M. Cohen
Chief, Resource Assessment Division	Kenneth Sherman

Chief, Research Management Division	Vacant
Chief, Management Support Division	Fred W. Brooks
Associate Director for Resource Utilization	Joseph W. Slavin
Deputy Associate Director	Dr. H. M. Hutchings
Chief, Economic Research Division	D. Hoyt A. Wheeland (Acting)
Chief, Extension Division	James F. Murdock
Chief, Statistics and Market News Division	B. G. Thompson (Acting)
Chief, Market Research and Services Division	Morton M. Miller
Chief, Financial Assistance Division	Michael L. Grable (Acting)
Chief, Fishery Products Research and Inspection Division	Thomas J. Billy (Acting)
Director, Pacific Fishery Products Technology Center	Dr. Maynard A. Steinberg
Director, Atlantic Fishery Products Technology Center	Louis J. Ronsivalli
Director, College Park Fishery Products Technology Laboratory	Dr. George M. Knobl, Jr.
Associate Director for Resource Management	Dr. Robert F. Hutton
Deputy Associate Director	Walter Kirkness
Chief, Office of State-Federal Relationships	Richard H. Schaefer
Chief, Water Resources Management Division	Yates M. Barber, Jr.
Chief, Law Enforcement and Marine Mammal Protection Division	Vacant

Director, Northwest Region	Donald R. Johnson
Deputy Director	John B. Glude
Director, Columbia River Fisheries Development Program	Dr. Fred C. Cleaver
Director, Pribilof Islands Program	William L. Peck
Director, Southeast Region	Harold B. Allen (Acting)
Deputy Director	Harold B. Allen
Director, Gulf Coastal Fisheries Center	Dr. Joseph W. Angelovic
Director, Northeast Region	Russell T. Norris
Deputy Director	William G. Gordon
Director, Middle Atlantic Coastal Fisheries Center	Dr. Carl J. Sindermann
Director, Southwest Region	Gerald V. Howard
Deputy Director	Floyd S. Anders, Jr.
Director, Tiburon Fisheries Laboratory	Vacant
Director, Alaska Region	Harry L. Rietze
Deputy Director	Robert W. McVey
Director, Auke Bay Fisheries Laboratory	Dr. William A. Smoker
Public Affairs Officer*	John A. Guinan
Legislative Advisor*	J. Kip Robinson
Staff Attorney*	Herbert L. Blatt

*NOAA primary liaison personnel for NMFS

BUDGET

Appropriations for fiscal year 1974, covering those budget activities for which NMFS has program responsibilities, provided an increase of $2,275,000 over the adjusted base program. This included $344,000 for enforcement and surveillance activities in excess of the amount included in the President's budget. In addition, the Congress added $421,000 to the fiscal year 1974 appropriation so that NOAA's Office Fleet Operations could reactivate a fisheries research vessel. The vessel Delaware II will be reactivated with these funds. The appropriation also provided $500,000 for pollution abatement engineering and design studies for the NMFS hatcheries on the Columbia River.

Comparative Summary for Fiscal Years 1973 and 1974

Activity	Adjusted FY 1973	Change	Appropriated FY 1974
	(In Thousands of Dollars)		
Resource Research & Assessment	$23,770	+ 1,312	$25,082

This budget subactivity includes the marine resources monitoring assessment, and prediction program (MARMAP) to determine and predict the abundance and distribution of living marine resources and research to develop necessary technology. It also includes biological and ecological investigations to develop an in-depth understanding of living marine resources, their environment, and the interrelationships between them. Ship support is included under biological investigations. Data produced by resources research and assessment programs are necessary for proper management and utilization of marine resources. The change of $1,312,000 includes an increase of $891,000 for carrying out responsibilities under the Marine Mammals Protection Act of 1972 (P.L. 92-522) to conserve and protect whales, porpoises, seals, and sea lions. The remaining $421,000 is earmarked for the reactivation of the vessel Delaware II by NOAA's Office of Fleet Operations.

Resource Management & Development	$26,309	+ 1,384	$27,693

This budget subactivity covers: formulation and implementation of management policy, including acquisition of data concerning foreign fishing, and related enforcement and surveillance functions; grants-in-aid to States, on a cost-sharing basis, to assist in management and development of fishery resources and related research; analyses and recommendations concerning the effect of proposed environmental changes; research on feasibility of aquaculture for selected species, including related technology; restoration of anadromous fisheries, primarily salmon in the Columbia River, including the operation of hatcheries, fishways, and screens, and the development of methods and technology to improve survival of fish during migration between ocean and spawning areas; extension services; statistical, marketing, and economic services; research on harvesting methods and technology; the development of technology and methods which will permit safer and greater utilization of fishery resources;

and Pribilof Islands operations, including fur seal research and management under the terms of the international Interim Convention on the Conservation of North Pacific Fur Seals and the Fur Seal Act of 1966. Program increases for FY 1974 included $792,000 for State-Federal fisheries management; a $344,000 Congressional add-on for enforcement and surveillance of foreign fishing activities; and $248,000 for environmental impact analysis. The adjusted base amount includes $500,000 for pollution abatement engineering and design studies for hatcheries on the Columbia River.

Fisheries Financial Support Services	$ 683	-	$ 683

These funds provide for management support for the Mortgage Insurance Program authorized by Title XI of the Merchant Marine Act, 1936, as amended by the Federal Ship Financing Act of 1972; the Vessel Construction Subsidy Program; and the new Capital Construction Fund Program. Appropriations for the Fishermen's Protection Fund, together with fees collected from vessel owners, provide for payment to vessel owners and crews to compensate for certain financial losses sustained as a result of fishing vessels being seized by foreign countries.

NMFS Totals*	$50,762	+ 2,696	$53,458

VESSEL ACTIVITIES

The integration of the major NMFS fisheries research ships with NOAA's National Ocean Survey (NOS) and Environmental Research Laboratories (ERL) ships to form a consolidated NOAA fleet, was completed during 1973. The NOAA fleet is operated by the Office of Fleet Operations (OFO), a component of NOS. Under the consolidated fleet concept, the Fleet Allocation Council (FAC) allocates vessel time aboard each ship to the requesting users and resolves conflicts arising from multiple needs for limited ship time. FAC is basically composed of the Directors of the various user agencies and the operating unit plus the Associate Administrator for Marine Resources; the Council is chaired by the Director of NOAA Corps with the Director of OFO serving as Executive Secretary.

The fleet consolidation was undertaken in phases to provide a smooth transition without disruption in service. The consolidation began on July 1, 1972, with the transfer (to NOS) of four vessels operating in the Northeast Pacific; these vessels were: John N. Cobb, Oregon, Miller Freeman, and

* These amounts do not include the Fisheries Loan Fund, which is financed from repayments of loans and interest payments; and administration of the Fishermen's Protection (Guaranty) Fund, which is financed from fees paid for participation in the program. It does not include funds for the October 1973 pay raise, the cost of executive direction and administration, and other services provided by the National Oceanic and Atmospheric Administration, and does not include budgetary resources available to the National Marine Fisheries Service from reimbursements and trust funds. It does include funds for NMFS ships managed centrally by the National Ocean Survey.

George B. Kelez. On January 1, 1973, four fishery research vessels operating in the Western Atlantic Ocean were transferred to NOS. These were Albatross IV, Delaware II, Oregon II, and George M. Bowers. On July 1, 1973, the remaining fisheries vessels were transferred. These were David Starr Jordan, Townsend Cromwell, Murre II, and Pribilof. These last vessels operate in widely dispersed areas: the David Starr Jordan in the Eastern Central Pacific, the Townsend Cromwell in the tropical Central Pacific, the Murre II in coastal Alaskan waters, and the Pribilof entirely with freight/cargo supply activities between Seattle, Washington, and the Pribilof Islands. Because of the nature of activities and the method of funding her operations, the Pribilof has continued to be operated and funded by the program. Special arrangements have also been made with the program for operating the Murre II in a joint supply/research mode; the vessel is operated by the program with advice, assistance, and funding by OFO.

Funding cutbacks in NMFS, near the end of 1972, resulted in the removal of the George B. Kelez from fisheries service, the lay-up of the Delaware II and Townsend Cromwell, and the disposal of the Charles H. Gilbert in 1973; prereactivation work aboard the Miller Freeman was discontinued and the vessel has remained in storage during the year. Plans were laid during 1973 for reactivating the Delaware II. This vessel is expected to be back in active service during 1974. Preliminary plans are underway to reactivate the Townsend Cromwell by the end of 1974.

The fisheries research vessels are listed in Table 2.

Table 2.--Fisheries Research Vessels

	Vessel	Length (ft.)	Home Port	General Area of Operations	Use (Programs Emphasis)
1.	Albatross IV	187	Woods Hole, Mass.	N.W. Atlnatic	Resource Assessment
2.	Geo. M. Bowers	73	Miami,	S.E. U.S. Coastal (Inshore)	Invertebrate Assessment & Technology
3.	John N. Cobb	93	Seattle, Wash.	N.E. Pacific	Resource Assessment & Technology
4.	David Starr Jordan	171	San Diego,	Eastern Central Pacific	Resource Assessment
5.	Murre II	86	Auke Bay, Alaska	Alaska Coastal (Inshore)	Ecology, Oceanography, & Resource Assessment
6.	Oregon	100	Kodiak, Alaska	Alaska Cont. Shelf	Groundfish Assessment
7.	Oregon II	170	Pascagoula, Miss.	Eastern Cent. Atlantic Gulf of Mexico & Caribbean	Resource Assessment
8.	Townsend Cromwell	159	Storage/Seattle, Wash.	Central Pacific	Inactive *
9.	Delaware II	155	Storage/Norfolk, Va.	N.W. Atlantic	Inactive *
10.	Miller Freeman	215	Storage/Seattle, Wash.	Bering Sea, Gulf of Alaska	Inactive
11.	Pribilof	222	Seattle, Wash.	Seattle to Pribilof Islands	Freight Cargo Carrier

* Plan to reactivate in 1974.

MARINE RECREATIONAL FISHING ACTIVITIES

When NOAA was created in 1970, the new NMFS incorporated--in addition to the Bureau of Commercial Fisheries (BCF)--four sport fish laboratories and several sport fish programs previously operated by the Bureau of Sport Fisheries and Wildlife, Department of the Interior. On the grounds that both sport fish and commercial fishing were resource-oriented, separate sport fish and commercial fish functions were consolidated. Thus the former sport fish laboratories lost their specific identification with sport fish and became responsible for all living marine resources in their particular areas. At the same time, the former BCF laboratories, heretofore mainly oriented towards commercial species and commercial fishing operations, broadened their horizons and began to look at the sport fish and fisheries of their areas.

After about three years of operating combined sport fish/commercial oriented research it became apparent that NMFS bore the responsibility of designing research more directly relevant to the special needs of the Nation's marine recreational fishermen. The year 1973 saw several examples of such research. Among them:

(1) In cooperation with the Fisheries Institute of the University of Washington and the Washington Department of Fisheries, the Northwest Fisheries Center, Seattle, Laboratory began in 1972 to conduct weekly acoustical surveys of Lake Washington during June, July, and August to locate concentrations of sockeye salmon. After each weekly survey, a chart showing areas of salmon concentrations and the depth distribution of the fish was issued to the news media for use by anglers. Response by news media and the fishing public was favorable. Anglers used the information to improve fishing strategies for a species previously thought unavailable to them. Repeated in the summer of 1973, these surveys again proved beneficial to the sportsmen.

(2) In order to relieve some of the sport fishing pressure on the much-sought Pacific salmon, a new project was begun in 1973 to locate, identify, and disseminate information on the rockfish and flatfish of Puget Sound, not yet heavily fished by sportsmen.

(3) Some of the more widely sought game fishes are the billfishes. These include the marlins, sailfish, and wahoo. They are fished on all coasts except the Pacific Northwest. NMFS is involved in cooperative tagging programs of billfishes in Hawaii, southern California, Florida, and the Northeast. Being readied for publication in 1974 is a comprehensive collection of scientific papers on the billfishes and billfisheries of the world, volumes which will constitute a unique contribution to the scientific literature of these species.

(4) NMFS is cooperating with the Woods Hole Oceanographic Institution in its continuing program of tagging bluefin tuna, one of the principal game fishes of the northwest Atlantic. It is also engaged in a cooperative program with sportsmen in tagging sharks out of Narragansett, R. I.

(5) During 1973, NMFS scientific personnel covered over three dozen fishing tournaments to secure catch and effort data and take scientific measurements.

Comprehensive newsletters covering tournament and tagging information were sent out from three Centers to about 3,000 interested persons.

(6) The newest NMFS research facility, the Port Aransas, Texas, laboratory, was completed in 1973, and staffing was begun. Initial studies by a nucleus staff included development of techniques to capture, maintain, and induce spawning in sciaenid and bothid fishes such as speckled trout and summer flounder, and to study their physical and biological requirements for successful spawning, hatching, development, and growth in captivity. This new facility is the last of those authorized under the Migratory Game Fish Act of 1959. It will provide in the western Gulf area a scientific capability where none has previously existed.

(7) An exciting venture in 1973 was NMFS participation in the Sky Lab project. Six Northwest Florida sport fishing and charter boat organizations and a total of 325 anglers turned out on the August 4-5 weekend to help gather oceanographic and fishing information to compare with the airborne data of the aircraft and Sky Lab spacecraft. Although analysis is not complete, it appears likely that certain oceanic characteristics can be monitored from spacecraft and then utilized to determine game fish abundance and distribution.

INTERNATIONAL ACTIVITIES STAFF

The International Activities Staff coordinates NMFS activities relating to the review and analysis of foreign actions affecting marine resources of interest to the United States. It prepares position and background papers relating to such developments. Staff assistance is provided U.S. delegations to international negotiations concerning fisheries issues.

Periodic reports are issued concerning significant economic and technological developments in other countries that may affect trade and investment opportunities of U.S. firms. In addition a report of the numbers, nationalities, and types of foreign vessels fishing off the U.S. coasts is compiled monthly.

A translation program provides industry, government, and scientific circles with fishery and oceanography translations. This program serves as an international clearinghouse for translations in these fields. The translations are financed primarily with P.L. 83-480 special foreign currencies and are prepared in Israel, Poland, Yugoslavia, and Tunisia. Emphasized are papers dealing with fisheries research in Japan and the eastern European nations--literature otherwise largely inaccessible in the United States.

The United States is a member of eight international fishery commissions given responsibility under treaty agreements to manage and conserve fishery resources in various areas of concern to the United States. It is also a party to twelve bilateral fishery agreements adapted to deal with more specialized management problems.

NMFS has primary responsibility in most instances for conducting the scientific assessments and investigations to determine the international measures needed to protect fishery resources. In addition, various officials of the Service have been appointed to serve as U.S. spokesmen or commissioners on several of the international fishery commissions. Following are some of the accomplishments in the international area during 1973:

(1) Seven bilateral fishery agreements affecting resources of interest to the United States were renegotiated or extended during 1973. These included an agreement with Brazil regarding fishing opportunities and conservation measures for shrimp off Brazil; an agreement with Canada concerning reciprocal fishing privileges in contiguous fishing zones of both countries; agreements with the USSR restricting their activities off the U.S. Atlantic Coast. In addition a new bilateral agreement was concluded with Romania on December 4, 1973, limiting their fishing off the U.S. Atlantic Coast.

Some of the significant new features included in these agreements are: (a) the U.S.-USSR and the U.S.-Polish fisheries claims boards established to consider voluntarily submitted damage claims arising from gear conflict; (b) in the North Pacific, stricter controls and reduced quotas for Soviet crab fisheries and the extension of conservation measures for other species such as Pacific Ocean perch, Pacific hake, and flatfishes; (c) in the Atlantic area new restrictions closing substantial areas to bottom trawling by Soviet, Polish, and Romanian fleets.

(2) Agreement was achieved at the 1972 Annual Meeting of the North Pacific Fur Seal Commission to cease indefinitely commercial harvesting of seals on St. George Island, a major rookery in the Bering Sea, and to undertake an intensive study of factors affecting seal abundance.

(3) Agreement was reached in the International Commission for the Northwest Atlantic Fisheries (ICNAF), on an overall national catch quota program off the U.S. North Atlantic coast for the next three years, designed to halt the decline in the biomass and to allow stocks to recover to levels producing the maximum sustainable yield. A key feature is that the overall quota is a second-tier quota imposed over and above individual quotas on specified species or stocks. The second-tier quota for each country is set below the sum of the individual species quotas to correct assessment errors and to stimulate more selective fishing that will minimize by-catch problems.

(4) Agreement was reached that Japan would ban trawling in specified areas and periods during 1974 in the eastern Bering Sea when halibut are taken in substantial quantities as an incidental catch. This will help protect juvenile halibut from capture by trawlers and reduce the risk of further declines in halibut abundance. The agreement was worked out as a result of U.S. and Canadian proposals at a meeting of the International North Pacific Fisheries Commission and diplomatic contacts after the meeting.

PLANS AND POLICY DEVELOPMENT STAFF

The Plans and Policy Development Staff advises the Director on those activities of NMFS involving planning, program coordination, and needs of the future in developing missions, goals, objectives, and policies and in so doing provides coordination within NOAA and with other agencies of Government and public and private organizations. It conducts and/or coordinates special analytical studies to develop and evaluate alternative solutions to problems.

The Staff advises on the design, development, and use of management and data information systems and the evaluation of the effectiveness of NMFS management, programs, and activities. It coordinates the formulation, justification, and presentation of the NMFS program budget, including the development of program papers, projects, annual budget estimates, and justifications for appropriations. It provides staff assistance to the Directorate in executing the budget, including preparation of data for apportionments, cost operating plans, and control schedules, and preparation of requests for supplemental appropriations and reprogramming actions. It performs analyses on the rate of progress in carrying out authorized programs and recommends changes, as necessary, to achieve the best utilization of funds and manpower or to meet urgent unforeseen requirements.

Established in 1971, the authorized interdisciplinary Staff includes program analysts in the several activity areas and disciplines of the NMFS, as well as financial analysts and program specialists, and secretarial support.

In addition to its regular assignments, the Staff has a National Fishery Planning Staff. This involves the development of various alternatives together with cost-benefit analysis for recommended courses of action by NMFS for the next 10 years.

Conferences were held, on both the East and West Coasts in 1973 with the staffs of the Financial Management Centers to resolve any problems. Planning and implementation of an NMFS-wide computer-supported planning, budgeting, management, and control system was started. The system provides for the integration of task planning based on management by objectives and budget line items. It has been used for the development of the FY 1976 budget estimates.

OFFICE OF CONGRESSIONAL AND LEGISLATIVE AFFAIRS

That portion of the Office of Congressional and Legislative Affairs (NOAA), which is detached for service with the National Marine Fisheries Service (NMFS), is responsible for formulating and conducting work related to the legislative program of NMFS and the relationships of that service with members of the Congress. The legislative program is complex and diversified in nature in that NMFS must deal with numerous legislative proposals and programs relating to or affecting the United States commercial fishing industry, the sportsmen interested in the marine recreational fishery, and the living natural resources utilized by or affecting both.

The Detachment has responsibility for the preparation, coordination, and implementation of the NMFS legislative program and maintains liaison with the other components of the Office of Congressional and Legislative Affairs (NOAA) and with the Assistant General Counsel for Legislation in the Department in order to accomplish review and coordination of reports on specific legislative proposals and to assure proper response to a variety of Congressional requests for information and assistance. Additional functions of the office are to prepare testimony for hearings; attend hearings; review and correct transcripts of hearings as necessary; analyze Federal statutes bearing on NMFS programs, indicating the extent of impact on NMFS functions and general procedures; and provide general consultative and advisory services on legislative and related matters.

During the 1st Session of the 93d Congress (1973) three new Federal laws pertaining to marine fisheries and the commercial fishing industry were enacted. These laws were:

Public Law 93-24 (H.R. 1975) April 20, 1973.--Public Law 93-24 amends the Consolidated Farm and Rural Development Act, and in doing so, increases the availability of disaster loans to the commercial fishing industry (among others) under both the Rural Development Act and the Small Business Act. P.L. 93-24 also raises the maximum interest rate of disaster loans made under both Acts.

Public Law 93-205 (S. 1983) December 28, 1973. "The Endangered Species Act of 1973".--This Act provides for the conservation, protection, and propagation of species or subspecies of fish and wildlife that are presently in danger or extinction (endangered or are likely to become endangered in the foreseeable future (threatened). The Act sets up a comprehensive program to be jointly administered by the Secretaries of the Interior and Commerce, which, among other things, prohibits the import, export, taking, and interstate transportation for commercial purposes of any endangered species and authorizes the issuance of regulations to control various activities involving threatened species. A cooperative State-Federal effort is also called for in the Act with a grant program being established for Federal money to assist the States.

Public Law 93-242 (H.R. 8529) January 2, 1973. "Offshore Shrimp Fisheries Act of 1973".--This Act implements the United States-Brazil shrimp fishing agreement and enforces it as it pertains to or with respect to U.S. fishermen. The agreement establishes a shrimp conservation zone off the coast of Brazil, within which the activities of shrimp vessels of the two countries will be regulated. The Act also declares

a number of species of crustacea (including the American lobster), mollusks, and sponges as U.S. Continental Shelf fishery resources. All but the lobster had previously been so declared by administrative action.

Additionally, both Houses of Congress passed Senate Concurrent Resolution 11, "To express a national policy with respect to support of the United States fishing industry." The resolution does not have the force and effect of a law but is merely an expression of the desires of Congress. S. Con. Res. 11 states in effect that it is the policy of the Congress that the U.S. fishing industry should be strengthened and that the coastal fisheries found off the United States should be protected from excessive foreign fishing. It states further that Congress is prepared to take interim measures to conserve fish stocks and to protect the domestic fishing industry. It also supports ongoing State/Federal fisheries conservation programs.

PUBLIC AFFAIRS

The Public Affairs activities of NMFS are a function of the Public Affairs Officer and his staff, who are detailed to NMFS and supervised by the NOAA Director of Public Affairs.

The NMFS Public Affairs Office is responsible for liaison between NMFS and NOAA in all public affairs activities. The Office functions as a part of the staff of the NMFS Director and has close contact with the Associate Directors as well as the NMFS Regional and Center Directors.

The Public Affairs Office produces national news releases and feature items which reach as many as 1,500 news outlets across the Nation. It maintains a special mailing list of about 700 outdoor writers who are sent selected news releases. The Public Affairs Office also prepares articles for each issue of NOAA Magazine, published quarterly, and for Commerce Department and other Federal publications. Reprints of some of the written material are used throughout NOAA/NMFS for many purposes.

The NMFS Public Affairs Office also arranges for interviews of NMFS personnel with representatives of all media. It responds to inquiries from the press, radio and TV, and the general public. It maintains close contact with Regional Offices and Centers on matters of public interest.

Public Affairs personnel attend certain fisheries functions throughout the United States and coordinate or prepare brochures, pamphlets, and similar material. They also participate in preparing material for local and national exhibits related to fisheries matters and cover newsworthy events as required in the various NMFS Regions.

MARINE FISHERIES ADVISORY COMMITTEE

The Marine Fisheries Advisory Committee (MAFAC) was established February 17, 1971, by the Secretary of Commerce under provisions of Reorganization Plan No. 4 of July 1970 and Executive Order 11007, Section 3b, Act of July 1, 1954 (15 U.S.C. 713-3(c)). The Committee Charter was renewed on January 3, 1973, as required by Public Law 92-463. MAFAC members are appointed by the Secretary and advise him on matters pertinent to the Department of Commerce's responsibilities for marine fisheries resources.

The Committee held two meetings in Washington, D.C.: February 6-8, 1973 and October 9-11, 1973.

Membership of the Committee as of December 31, 1973 was:

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Mr. Theodore T. Bugas
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Mr. Charles R. Carry
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Mr. Frank L. Cassidy, Jr.
President, Son Sales, Ltd.
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Dr. James A. Crutchfield, Jr.
Department of Economics
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Mr. Jacob J. Dykstra
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Mr. Robert M. Thorstenson
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South Carolina Wildlife and Marine Resources Department
P.O. Box 167
Columbia, South Carolina 29202

Mr. Clifford V. Varin
President, Fire Island Sea Clams Company, Inc.
P.O. Box 85
West Sayville, New York 11796

Mr. W. Horace Witherspoon, Jr.
4645 Fairfield Drive
Corona del Mar, California 92625

Executive Secretary: Alfred J. Bilik
National Marine Fisheries Service

RESOURCE RESEARCH

The Office of Resource Research plans, develops, and manages national research programs designed to better understand living marine resources and the environmental quality essential for their existence, and to describe options for their utilization consistent with national needs and goals. Programs are carried out at seven Centers, which coordinate and oversee research at 23 laboratories and field stations under their jurisdiction, and at eight laboratories and stations under the supervision of Regions or the Washington Office.

Research programs under way are categorized under seven major national efforts: resource assessment, aquaculture, impact of environmental change, marine mammals, life studies, fishery oceanography, and fisheries technology. A brief description of each of these activities and its accomplishments during 1973 follows.

RESOURCE ASSESSMENT

Assessment of the status of the Nation's living marine resources is a major and unique function of NMFS. Effort for 1973 focused on four endeavors: further work on MARMAP, assessment of stocks which come under international agreements, fishery management advances, and--particularly important in a time of shortages and rising demands for fishery products-- identification and location of underutilized species.

MARMAP System Development

Continued progress was made in the development of the marine resources monitoring, assessment, and prediction program--MARMAP. The program provides annual assessments of changes in the abundance and condition of fish stocks of interest to the United States. In winter 1973, the second multi-ship survey to evaluate the subsystem for sampling ichthyoplankton (fish eggs and larvae) and their environment was completed in the Atlantic from Cape Cod to the Caribbean. Unusual concentrations along the mid-and south Atlantic coast of larval spotted hake, mullet, herring, weakfish, spot, and croakers suggested that these species could support expanded fishery operations. As in summer 1972, extensive concentrations of tar and plastics contaminated the surface net hauls. Tar clumps were found most frequently in the western boundary of the Sargasso Sea; plastic spherules (2-3 mm wide) were most numerous off Long Island and New Jersey.

MARMAP surveys for older fish (juvenile and adult groundfish stocks) were conducted for the first time along the Atlantic coast from Nova Scotia to Florida in autumn 1973. Standard trawling and data reporting methods were used by NMFS fisheries centers (Woods Hole, Sandy Hook, Beaufort), the State of South Carolina Marine Resources Laboratory, Charleston, and cooperating Polish, USSR, and West German vessels. The year 1973 was the seventh year that joint U.S.-USSR trawl surveys were conducted from Cape Cod to Cape Hatteras. These intensive census cruises have served as a model for development of the MARMAP and ICNAF area-wide surveys which are now conducted by several of the ICNAF member countries. These surveys provide an essential data base for assessing

annual status of fish stocks and for monitoring the effects of fishing on the total finfish biomass. Simultaneous towing for ichthyoplankton corroborated earlier findings of large concentrations of spot and croakers in coastal waters of the mid-Atlantic states.

Species Assessments

Annual assessments of the condition, changes in abundance, and predicted maximal yield levels were prepared by the NMFS fisheries centers to support negotiations and apply effective international management practices in eight bilateral agreements, six commissions, and domestic State-Federal programs. The data were obtained from analyses of landed catches and MARMAP research surveys for a number of important stocks including salmon, tuna, shrimp, halibut, cod, crab, flounder, hake, herring, haddock, mackerel, menhaden, and lobster. Special surveys were conducted for marine sport fish species by the Northwest Fisheries Center, Seattle, to provide information on angling opportunities and fishing techniques for recreational anglers in the Puget Sound area.

On the Atlantic coast, the sport fish tagging program of the Atlantic Estuarine Fisheries Center, Beaufort, indicated that stocks of groupers, snappers, and porgies were in greater abundance than sport fish landings indicated. Analyses of catch-effort data showed little change in the number of anglers (49,000) and their estimated annual catch (1.3 million pounds) off the coasts of the Carolinas. Catch-effort and biological data from 8,000 specimens were collected and analyzed by the Southeast Fisheries Center, Miami, to obtain better estimates of large billfish and tuna populations that were fished in some 32 Atlantic coast tournaments in 1973.

Fishery Management Advances

The Northeast Fisheries Center, Woods Hole, provides assessments of the total yields available from the fish stocks off New England and the mid-Atlantic states. The results, based on analysis of data from research vessel surveys and fishery statistics from all nations fishing the area, indicated serious overfishing, and led to the agreement by all ICNAF member countries to reduce the total catch of all species to allow for restoration of the stocks. This is the first time an international agreement limiting total catch from an area has been negotiated. It will provide greater opportunities for development of U.S. fishing in the area.

In 1973, an observer program was initiated by the Northwest Fisheries Center, Seattle, on Japanese trawling vessels in the Bering Sea. Incidental catches by the several hundred vessels of this fleet included a minimum of approximately 2 million halibut and 139 million tanner crabs. The observer program is an important information source for developing an effective management rationale for the heavily exploited North Pacific fish stocks.

Using Atlantic-wide data on tuna, scientists at the Southwest Fisheries Center, La Jolla, concluded that Atlantic yellowfin tunas stocks were in good condition in 1973. These analyses also indicated that the Atlantic yellowfin tuna fishery is approaching or has attained a plateau. Substantial increases in sustainable yield of yellowfin cannot be obtained by increasing fishing

effort unless there are accompanying changes in the fishery, i.e., spatial or temporal distribution of fishing effort, etc.

Basic planning has been completed for the development of an alternative yellowfin tuna management system for the eastern tropical Pacific, a management system for Atlantic tuna stocks, and a global tuna system computer model for quantitatively assessing the impact of management decisions on the world tuna system.

Underutilized Resources

In the Atlantic, a large and undeveloped resource of the little-harvested mollusk, the ocean quahog, was located on survey cruises by the Mid-Atlantic Coastal Fisheries Center, Sandy Hook. Abundance is estimated at about 2.5 billion pounds in coastal waters from New Jersey to Virginia and 3.4 billion pounds off Long Island. From North Pacific trawling surveys and analyses of catches of other countries (USSR and Japan), the Northwest Fisheries Center, Seattle, estimates a ten-fold increase in pollock stock in the Gulf of Alaska over the population levels of the past decade. Other latent resources targeted for accelerated assessment investigations include red crab, squid, and species along the Atlantic seaboard, and croaker populations in the Gulf of Mexico.

AQUACULTURE

Aquaculture research seeks to accelerate the economic development of commercial aquaculture and to provide methods for stock enhancement supporting increased food and recreation from the sea. Major emphasis is currently directed to the culture of Pacific salmon and penaeid shrimp to develop information and systems necessary for culturing these species under controlled conditions.

At the Northwest Fisheries Center, Seattle, studies under way on the saltwater pen-rearing of Pacific salmon involve rearing system development and evaluation, field diagnosis and treatment of saltwater salmonid diseases, evaluation and administration of experimental feeds and stock development and breeding. The Auke Bay Fisheries Laboratory (Auke Bay, Alaska) is focusing attention on research to permit the development in Alaska of new approaches to enhance and rehabilitate Pacific salmon runs and to create opportunities for ocean ranching--proprietary harvest of surplus returning fish to private hatcheries.

Shrimp culture studies at the Gulf Coastal Fisheries Center, Galveston, are directed toward finding a dependable method for maturing female shrimp in captivity; developing economical feeds which will provide the nutritional needs of shrimp; developing methods for the recognition, prevention, and treatment of diseases; and developing methods for the intensive culture of shrimp in closed system.

Accomplishments in aquaculture during 1973 include:

(1) Promising results of vaccines and vaccination systems for preventing outbreaks of Vibrio disease--a major problem in saltwater pen-rearing of salmon,

(2) Successful crosses of the Asiatic cherry salmon with native Pacific salmon, crosses which showed partial immunity to local Vibrio diseases,

(3) Installation and seeding of a 400,000 sockeye salmon experimental gravel incubator hatchery in Alaska--the first of its kind in this area,

(4) Enhancement of a pink salmon run through experimental hatchery production of fry from gravel incubators,

(5) Construction and initial testing of an experimental closed raceway system for high-density shrimp culture,

(6) Formulation of a shrimp feed using low-priced products and wastes as principal ingredients,

(7) Initiation and operation of a diagnostic service for the identification of the causes of diseases in crustaceans and fish cultured by commercial and research interests and,

(8) Training of 28 scientists (25 foreign investigators) on all aspects of shrimp culture.

IMPACT OF ENVIRONMENTAL CHANGE

NMFS environmental research emphasizes studies of estuarine and nearshore ecosystems to establish baseline data in order to evaluate the ecological impact of man-made and natural alterations.

Ecological research stresses investigations on the nature and extent of pollutants in the marine environment and their effect on living marine organisms, the cycling of pollutants through the food chain, and the impact of various man-made and natural alterations of the environment on marine life.

During 1973, ecological investigations were conducted at most of the NMFS centers and laboratories. For example the Atlantic Estuarine Fisheries Center, Beaufort, continued work on assessment of species structure, biomass, and energetics of the ecosystem; determination of major pathways and rates of flux for contaminants, especially heavy metals, radionuclides, and pesticides; and, determination of organismic responses to important contaminative additions to which organisms are normally exposed. The Northwest Fisheries Center, Seattle placed increased emphasis on research involving the relationships between oil and aquatic organisms. The Middle Atlantic Coastal Fisheries Center completed a chronic exposure facility at its Milford, Conn. Laboratory. With this facility scientists can expose marine organisms to sublethal levels of various pollutants for studies of physiological stress. Ecosystems investigations at this center are primarily concerned with benthic-zooplankton food chain studies, physiological responses to toxins and organic wastes, and zoogeographic distribution of benthic populations, with emphasis on the New York Bight area.

MARINE MAMMALS

Marine mammal programs involve research on the life history and

population dynamics of whales, porpoises, and seals to establish management controls and techniques for their protection and conservation. During 1973, work on the goal of reducing or possibly eliminating porpoise mortalities in the tuna purse seine fishery was substantially augmented. A prototype net of different taper and mesh was designed and constructed to minimize porpoise mortality. Preliminary tests commenced to evaluate its effectiveness. Additionally, new gear and methods to achieve optimum deployment and fishing of purse seines were designed and tested.

On the Pribilof Islands and in the North Pacific Ocean, research was carried out on the age structure, population dynamics, feeding habits, distribution, and migration of fur seals and their interrelationships with other living marine resources. A fur seal research control area study was initiated, setting aside the island of St. George as the control area of no harvest. New studies were begun to monitor the harvest of bowhead whales and examine the biology and population dynamics of those whales and arctic seals.

LIFE STUDIES

Life studies include research on the physiology, anatomy, behavior, classification, pathology, biochemistry, reproduction, migration, growth, and feeding of marine fish and shellfish. A number of projects are under way at NMFS centers and laboratories dealing with various life processes of economically important marine species. Knowledge obtained from such studies provides essential ingredients in formulating management measures.

Significant research efforts during 1973 included a major research program on sensory and other physiological reactions of tunas and tuna-like fishes to their physical environment; the Northwest Fisheries Center, Seattle, Laboratory completed an acoustical survey of sockeye salmon in Lake Washington the Systematics Laboratory completed a revision of the crab genus Callinectes, a group which includes the valuable blue crab caught commercially in the southeast; a revision of the penaeid shrimp genus Solenocera from the western Atlantic; a study of the distribution of the penaeid shrimp genus Hepomadus in the western Atlantic; and made major input into part six (dealing with macrourids and other deep-sea fishes) of "Fishes of the Western North Atlantic" a definitive work being published by the Sears Foundation for Oceanographic Research, Yale University.

FISHERY OCEANOGRAPHY

Accomplishments in fishery oceanography in 1973 included:

(1) Cooperative research with the American Fisherman's Research Foundation, representing the West Coast albacore fishing industry, was continued. This research, on the early shoreward migration of the albacore tuna, showed that commercial quantities of these fishes can be found earlier and farther offshore than expected. Also, it was found that the shoreward migration and early distribution of albacore appear to be strongly influenced by marine environmental factors, particularly the location of Transition Zone Water and associated oceanic fronts.

(2) A program of environmental sampling was conducted on two multiship MARMP cruises in the western North Atlantic and Caribbean Sea; an operational test cruise of Survey I (ichthyoplankton) was completed in January-March from four vessels operating between Cape Cod and the northern Caribbean, and a MARMAP groundfish/ichthyoplankton cruise, involving three vessels operating from Cape Cod to Cape Canaveral, was completed during the fall months.

(3) A report describing the circulation in the upper layer and the distribution of selected physical and chemical variables in the western North Atlantic from Cape Cod to the northern Caribbean, was completed as part of "MARMAP Ichthyoplankton Surveys - A Report on the First Atlantic Operational Test Phase Cruises." This report was based on the first of the cruise conducted in the late summer months of 1972.

(4) A time-series study of monthly indices of intensity of large-scale wind-induced coastal upwelling at selected locations along the west coast of North America was completed for the period of 1946-71. The results of this study were published in a NOAA Technical Report and are available in a variety of formats for use by biologists in correlative studies.

FISHERIES TECHNOLOGY

Developments in fisheries technology in 1973 included two large-scale experiments involving satellites, astronauts, and fishermen (in one instance commercial fishermen, in the other game fishermen); the refinement of an underwater sensing system which can explore the ocean from the surface to the bottom; and a fresh approach to sorting plankton.

Highlights of 1973 include completion of a cooperative NMFS/NASA/Industry experiment in the Mississippi Sound designed to demonstrate the potential of satellite and aircraft remote sensing for providing relevant information about selected fishery resources. Image density levels from ERTS-1 were found to correlate with distribution patterns of adult menhaden and a model was developed which appears useful for predicting menhaden distribution from satellite-acquired oceanographic information. A follow-on cooperative study has been proposed for 1974 to verify and expand upon these results.

The data acquisition phase of another NMFS/NASA/Industry cooperative satellite related program was completed in late summer. This experiment involved Sky Lab, aircraft, and approximately 135 volunteer sport fishing boats, and was designed to develop correlations between selected oceanographic parameters (i.e., those that can be remotely measured) and the distribution of billfishes in the northern Gulf of Mexico. Early analyses suggest that valid correlations exist. Work in 1974 will be directed at statistical verification.

A cooperative Sea Grant/NMFS effort to design, develop, test, and evaluate RUFAS II (Remote Underwater Fisheries Assessment System) was completed. This system represents a substantially upgraded version of RUFAS I. It is equipped with TV and still-photography cameras, lights, and acoustical devices; can be flown at constant heights above the bottom; and operates at depths down to 300 fathoms. The system will be used for surveys of bottom invertebrates, groundfish, and pelagic fish.

RESOURCE UTILIZATION

The Office of Resource Utilization plans, develops, and manages research, developmental, and service programs designed to provide utilization options for living marine resources and to assist such utilization consistent with national needs and goals. This involves: (1) programs of economic and marketing research, including demand and supply projections, benefit cost studies, and foreign trade analyses; (2) programs of collection, analysis, compilation, and dissemination of fishery statistical and market news information; (3) programs to assist the fishing industry by providing financial assistance in the form of loans, loan guarantees, tax deferrals, and insurance against seizures; (4) microbiological, chemical, and technological research to enhance the quality and utilization of fishery resources; (5) a voluntary national program of inspection and certification of fishery products; (6) programs to improve marketing practices and to alleviate extraordinary short-term supply-demand imbalances; and (7) programs to provide advisory services to the fishing industry. The Office consists of six Divisions--Economic Research; Extension; Statistics and Market News; Market Research and Services; Financial Assistance; and Fishery Products Research and Inspection.

ECONOMIC RESEARCH

The Economic Research Division provides economic analysis to identify problems and assess opportunities in various U.S. fisheries, and to relate benefits to costs for fishery programs. These analyses provide a basis for formulating policy and evaluating programs concerning both commercial and sport fisheries. In addition, the Division undertakes studies dealing with profitability of fishing and processing operations, demand for fishery products, feasibility of new technologies, and other related studies which are used by the fishing industry, investors, financial institutions, and the general public.

The work of the Division is complemented by and coordinated with Regional Economists in NMFS regional offices. The Regional Economist primarily provides economic advice to the Regional Director. From time to time the Regional Economist works with the Division on various research projects.

There are six major program areas of economic research:

(1) State-Federal fishery management--evaluates the economic impact of alternative management schemes designed to conserve the resource and insure the economic prosperity of fishermen;

(2) Recreational demand for living marine resources--explores the extent of the sport fishing industry as well as ways of evaluating sport and commercial resources;

(3) Competitiveness of the U.S. fishing industry--assesses the productivity, earnings, costs, and general ability of U.S. fishermen to compete not only with foreign producers, but with producers of other protein substitutes as well;

(4) Policy analysis--designed to use the results of the more basic research on the commercial and sport fishing industries in evaluating existing Government programs, new initiatives, and new legislative authority;

(5) Environmental hazards--explores the economic consequences of water pollution on the marine environment and the cost to the fishermen of meeting pollution standards; and

(6) Aquaculture economics--helps in determining the commercial feasibility of aquaculture.

Accomplishments of the economic research program include:

(1) Assessing the economic impact on various segments of the U.S. fishing industry of positions that might be taken at the Law of the Sea (LOS) conference in 1974;

(2) Evaluating the effects on earnings from vessel operations of increased fees to the Fishermen's Guarantee Fund, as provided for by section 7

of the Fishermen's Protective Act of 1967, and subsequent regulations; assisting the Financial Assistance Program of NMFS by providing economic input for determining that a given fishery is in need of regulation under Part 251 of Chapter II. 50 CFR (conditional fisheries);

(3) Initiating an economic study of U.S. aquaculture activity and an economics bibliography for aquaculture; participating in development of an aquaculture plan, under NOAA's objective to "conduct the research and development needed to demonstrate to private industry the economic viability of commercial scale aquaculture for certain species"; and

(4) Evaluating the undue economic hardship aspect of applicants seeking exemption from the provisions of the Marine Mammal Protection Act of 1972.

The NMFS Extension Division, a cooperator in the NOAA Marine Advisory Service (NMAS), serves as a program catalyst and communications expediter between NMFS and a variety of groups, individuals, and Federal Agencies. Program priorities include: (1) fishing vessel safety advisory services to reduce accidents at sea; (2) business management education to enhance business and financial management skills and decisionmaking of fishermen; (3) fishing vessel insurance activities aimed at reducing protection and indemnity (P&I) insurance rates; and (4) improving communications between NMFS and the fishing industry.

Voluntary cooperative safety advisory services are underway in each NMFS region. The program is organizationally based upon regional inter-organizational safety advisory councils to identify problems and priority areas of work and to provide a vehicle for sharing agreed upon responsibilities and work assignments. Several State Sea Grant Advisory programs and the Pacific Sea Grant Advisory Program are working with NOAA's NMAS and NMFS to incorporate projects related to fishing vessel safety in their programs.

Accomplishments of the extension program in 1973 include:

(1) A publication, "Fishermen's Simplified Recordkeeping Sheets," was developed, in collaboration with the Economic Research Division, and widely distributed to fishermen. Some three dozen workshops and meetings were held with fishermen and/or Farm Credit Administration officials regarding financial management related subjects. Sea Grant Advisory Programs in some eight coastal States now have active projects relative to fisheries business/financial management.

(2) Tips on conserving fuel used by fishing vessels were developed and distributed to fishing vessel operators. Regional extension personnel assisted the fishing industry with problems created by fuel shortages.

(3) Considerable NMFS support was provided the commercial fishing industry in an attempt to help combat rising insurance costs for commercial fishing vessels. A major thrust was in developing an alternative insurance system to the present P&I insurance system. Activities related to the vessel insurance problems included:

(a) an industry-wide conference held in Washington, D.C., in January;

(b) appointment of an Ad Hoc Group on Commercial Fishing Vessel Insurance composed of vessel owners' representatives, fishermen's representatives, insurance industry personnel, attorneys, and Government personnel; and

(c) two meetings of the Ad Hoc Group. Progress was made toward solutions to P&I insurance problems through: a systematic approach of insurance system model building tailored to industry needs an analysis of

the present P&I system, and an evaluation of model insurance systems.

(4) The extension staff helped plan and conduct a West Coast Vocational Fisheries Education Workshop in April which brought together, for the first time, representatives of West Coast fisheries, vocational organizations, and industry leaders to discuss fisheries-related vocational and educational programs, problems, and training needs.

STATISTICS AND MARKET NEWS

The collection and dissemination of data on commercial fisheries and marine sport fisheries is carried out by the headquarters staff and by 46 field stations under the following three major statistical programs:

(1) Commercial Fisheries Statistics -- The Service collects, stores, and publishes statistics on the commercial fishing industry of the United States. Included are: the volume and value of the commercial landings of fish and shellfish by species, region, State, and type of gear; number of fishing craft and gear operating in the fisheries; the production of processed fishery products; employment on fishing craft and in wholesale and fish processing establishments; and the per capita consumption of commercial fishery products.

During 1973, these data were published in about 300 monthly, quarterly, and annual statistical publications which were distributed to private industry; Federal, State, and local government agencies; libraries; universities; research institutions; foreign industry and governments; and United States Embassies. In addition, several thousand requests for information or special data were answered.

During the year, a study of data collection techniques in the Gulf and Atlantic Coast States was begun in cooperation with the Office of Management and Computer Systems, NOAA. An ADP program was developed so that the landings bulletins for New York could be printed directly from camera copy received from the computer. Of the 15 State landings bulletins, only those for Florida, Maryland, and Texas are now tabulated by hand and typed. The publication of "New England Fisheries" and other annual sectional bulletins was resumed during the year.

(2) Marine Sport Fish Statistics -- The Service collects and publishes statistics on the Nation's salt-water sport fisheries. During 1973, the Service published the "1970 Salt-Water Angling Survey," a 54-page statistical report on the number of marine sport anglers in the United States and their finfish catch. A final report was received from a private contractor giving a priority listing of marine sport fish data needs and two five-year program plans for collecting statistics, each at a different funding level. Using the report, a set of program requirements and a program for collecting national sport fish statistics were developed. A preliminary report was received from a private contractor as to the number of recreational boats in the United States and their use in salt-water areas.

(3) Current Market Information -- NMFS provides current information on market activities, cold storage holdings, imports, and exports. Five Market News reporting centers issue reports three times a week containing data on current market prices, landings, imports, holdings and movements of fishery products, as well as other information to promote efficient and orderly marketing of fish and shellfish and products prepared from them. There currently are 10,000 subscribers to this service.

The Market News Reports issued from Chicago and Hampton were

discontinued in March of 1973, owing to budget restrictions. Key data that appeared in these reports now appear in the Boston and New York reports.

During the year, telephone information centers were established in Boston, New York, Chicago, New Bedford, and Gloucester. The centers have selected landings and ex-vessel prices on tapes that will play back automatically to anyone phoning the center.

MARKET RESEARCH AND SERVICES

NMFS marketing activities cover three functional areas, i.e., market development, market intelligence, and consumer education. Market development activities include the investigation of potential domestic and export markets, and the provision of direct marketing to assist development and expansion of markets for domestically produced fishery products. Current emphasis in this program is in development of markets for underutilized species. The market intelligence activity provides, through scheduled market situation and outlook reports, analyses of current market factors--prices, landings, imports, exports, production, inventories, and consumption--to assist the orderly marketing of fishing products. The consumer education activity provides information on the physical, nutritional, and economic characteristics of fishery products to the general public, to institutional users, and to the seafood industry. This serves to broaden general consumer knowledge about alternative protein food sources, provides the institutional trade with knowledge in the preparation and use of fishery products, and keeps the seafood industry abreast of alternative production opportunities, particularly with regard to production of underutilized species.

Accomplishments of the market research and services program include:

(1) A major effort to help industry develop new domestic and export markets for mullet and mullet roe was initiated. As a result, the utilization of mullet was increased in the United States and new market outlets for mullet roe were developed in Japan, Taiwan, and France.

(2) Export marketing seminars were conducted to acquaint industry with marketing opportunities abroad, particularly for species which are underutilized in the U.S.

(3) Seven market intelligence reports covering the outlook for fish, shellfish, and industrial fishery products were issued during 1973.

(4) A budget recipe booklet, "A Little Fish Goes A Long Way," was developed for distribution to low-income families.

FINANCIAL ASSISTANCE

NMFS's financial assistance effort during 1973 was in a transitional period. The programs are moving toward the use, wherever possible, of private capital to accomplish the overall program mission. Where direct Federal funds remain involved, marginally productive activities are being eliminated in favor of those holding a demonstrable potential for long-term productivity. The anticipated effect of program transition will be a more highly integrated package to assist the U.S. fishing industry.

Special studies related to financial assistance included an analysis of the performance of the present financial assistance programs, a study of the industry needs now and in the near future, and completion of a General Accounting Office review of the financial assistance effort.

Accomplishments of the Service's financial assistance programs include:

(1) The Fisheries Loan Fund during 1973 provided loans for fishing vessels totaling $865,000. On March 1, 1973, an application moratorium was established in order to replenish the Fund's lending reserves, direct the program to meet the present day needs of the fishing industry, and eliminate loans for marginally productive purposes. When redirection is accomplished, the program will be oriented toward developing underutilized fisheries, stimulating the entrance of new vessels into selected fisheries when and if some form of extended fisheries jurisdiction is effected, assisting young fishermen (who customarily meet the greatest credit resistance) accelerate their career development, shifting vessels from over-utilized to less utilized fisheries, technological improvement, and financing the acquisition cost of used vessels to be upgraded with private capital made available by the other programs. The general ownership transfer of used vessels, ordinary repair and maintenance, refinancing general debt, and providing general operating capital will be eliminated.

(2) The Fishing Vessel Obligation Guarantee program was established by the Merchant Marine Act, 1936, as amended by the Federal Ship Financing Act of 1972. This program was in process of implementation during 1973, with interim regulations (50 CFR Part 255) being published for comment on July 31, 1973. This program provides an easier vehicle for private financial institutions to participate in the financing of fishing vessels. During the year only two cases, involving $165,000 in obligation guarantees, were closed owing to the programs being inactive during the better part of the year while interim rules and regulations implementing the late 1972 Act were prepared.

(3) The Capital Construction Fund program (implemented in fiscal year 1972) had about $10 million on deposit in 1973 as tax deferrable reserves for capital replacement and expansion. This program is permitting about 400 firms to defer Federal taxes on certain items (principally operational income) deposited in special accounts and reserved for future fishing vessel construction, acquisition, or reconstruction.

(4) Under the Fishermen's Guarantee Fund (formerly Fishermen's

Protective Fund) 170 fishing vessels entered into guarantee agreements and 51 claims were received, certified, and paid as a result of the seizure of U.S. fishing vessels in international waters by foreign Governments.

(5) A system was established during 1973 to limit financial assistance in those fisheries where the entrance of additional vessels can be demonstrated as unwarranted. This system was adopted as 50 CFR Part 251 on October 24, 1973. The first fishery to be proposed under the system was that for yellowfin tuna in the area regulated by the Inter-American Tropical Tuna Commission.

FISHERY PRODUCTS RESEARCH AND INSPECTION

NMFS conducts a broad program of basic and applied research related to the processing and utilization of fish and fishery products. A fishery products inspection and certification service is also available on a fee basis to processing establishments requesting it.

Overall direction and management of research activities other than those under way in the Pascagoula Fishery Products Technology Laboratory are the responsibility of the Fishery Products Research and Inspection Division in Washington, D.C. The Pascagoula Laboratory reports to the Southeast Regional Office, but its program is coordinated with that of the other technology laboratories. The other research facilities include the Atlantic Fishery Products Technology Center in Gloucester, Mass.; the Pacific Fishery Products Technology Center in Seattle, Wash.; a field laboratory at Kodiak, Alaska, under the direction of the Seattle Center; and the College Park Fishery Products Technology Laboratory in College Park, Md. These Centers and Laboratories employ food technologists, engineers, chemists, nutritionists, microbiologists, and various technicians with backgrounds in the life and physical sciences. The research facilities include chemical and microbiological laboratories as well as pilot plants.

The work of the Division is classified under six broad program areas:

(1) Development of underutilized resources, (2) improvement of traditional resources, (3) nutrition, (4) microconstituents, (5) pollution control, and (6) inspection services and process hazards.

Highlights of these programs in 1973 are given below:

Development of Underutilized Resources

Research on minced flesh blocks from black rockfish (Pacific) demonstrated that color, flavor, and keeping quality were improved substantially by simple processing modifications prior to freezing. Preliminary tests with Alaska pollock, menhaden, and carp showed that separated flesh from these species could be processed into frozen blocks and into heat-pasteurized spreads. The market potential of these species appeared promising based on evaluations by industry and limited consumer groups.

The functional properties of dried fish protein isolates and derivatives were demonstrated in food systems. Fish protein isolates successfully replaced 20 to 30 percent of egg albumin in cake mixes with no loss in cake volumes or changes in organoleptic properties. They were also used successfully to replace 10 percent of the beef in frankfurters. Acylated fish proteins exhibited excellent aeration and whipping properties and were used as the sole source of protein in preparing whipped dessert toppings.

Future use of marine invertebrates as sources of biologically active compounds or drugs appears possible as a result of preliminary isolation and characterization of a toxin from sea pens found in abundance in Pugent Sound.

In shellfish research on underutilized species such as deep-sea red

crab (Geryon quinquedens) and Jonah crab (Cancer borealis), the yield of crab meat was increased by optimizing cooking times and temperatures and picking techniques. This information has been used to assist processors in setting up processing lines and in training pickers. Presently, there are four plants processing these crabs, and landings rose from practically zero early in 1973 to over 500,000 pounds worth $150,000 ex-vessel during the last six months of 1973. Assistance was given to the fishermen which helped reduce crab mortalities aboard the vessel from levels as high as 50 percent. In research on processing of squid (an abundant but underutilized species in this country), several mechanical methods of skinning and eviscerating squid were developed and some highly acceptable new products were produced.

Upon being caught, many blue crabs become immobile. It is difficult for the processor to tell which are alive, and hence worth processing, and which are dead and should be discarded. Research has produced a method of distinguishing live from dead crabs by determining their pH (live crabs have a pH of 7.5 to 7.8 and dead crabs 6.1 to 6.7). A new method of heat-processing blue crab meat was developed that yields a product equal in quality to the usual pasteurized meat and completely eliminates the possibility of the growth of Clostridium botulinum. A meeting with members of the blue crab industry was held to discuss progress in this research program. Industry input to the direction and evaluation of this work has been invaluable in helping solve the problems besetting blue crab processors.

Meat/bone separation studies have produced very acceptable new products such as beef-fish mixtures, extruded sticks and portions, etc., from the minced flesh obtained from underutilized headed and gutted fish, frames from filleting lines, and V-cuts from fillet block operations. Currently, there are about ten meat/bone separators in operation in the New England area; one company produced over $1 million worth of minced fish blocks in the last four months of 1973. Separators are also finding use on the Pacific coast.

Traditional Resources Improvement

Laboratory scientists are investigating new methods of preserving and processing fish. A program which had received much emphasis was that for developing methods to process fish into fish protein concentrate (FPC). In 1973, after more than 10 years of investigations, this program was terminated and a comprehensive report prepared. In addition, sufficient scientific evidence was presented to the Food and Drug Administration to permit it to remove all packaging restrictions on FPC, thus paving the way for the use of FPC in commercial food products.

A refrigerated seawater (RSW) system modified by addition of carbon dioxide (CO_2) to the brine was improved for vessel use by developing an automatic CO_2 feed control. Field tests and product evaluations demonstrated that, in comparison with icing, the improved RSW-CO_2 system was significantly more effective in preservation of whole Pacific pink shrimp and halibut at sea.

Improved quality of processed salmon and trout reared in commercial aquaculture systems resulted when fish were immobilized immediately after harvesting by immersion in low-temperature water followed by bleeding. The

appearance and the keeping qualities of the frozen-stored fillets were improved.

Nutrition

The nutritional parameters of fish and fishery products are being defined as a basis to more fully utilize their unique qualities in human and animal diets. Nutritionists are developing a comprehensive data bank to store the latest quantitative information on the nutrient composition of fish. This will provide the world's first truly comprehensive source of composition data on fish and fishery products.

In addition, studies were conducted on the composition of pelagic red crab (Pleuroncodes planipes) to assess its value as a dietary component in salmonid diets. Its high carotenoid content, which ranges from 10 to 16 milligrams per 10 gram of whole body weight, indicated that it could provide a relatively inexpensive source of carotenoid for pigmenting pen-reared salmonids. Rainbow trout fed diets containing 10 and 25 percent red crab were highly pigmented after two months of feeding.

Other studies showed that red crab could be fractionated into a dry feed material and a chitinous residue suitable for processing into derivatives such as chitosan.

Microconstituents

The microconstituent Program conducted at the Pacific Fishery Products Technology Center, Seattle, and the College Park Fishery Products Technology Laboratory, College Park, Md., deals with: (1) assessing potential problem constituents in the resource and fishery products from U.S. coastal and offshore waters, (2) identification and definition of problem microconstituents, and (3) resolution of defined problems. Within these three areas, the program is designed to provide a sound and comprehensive data base on the occurrence and significance of microconstituents in fish and fishery products. To date, efforts have been directed toward heavy metals, other inorganic trace elements, and organic contaminants, such as pesticides and PCB's.

A large resource survey has been initiated to obtain baseline data and identify possible problems related to 15 inorganic elements in over 200 species from U.S. offshore and coastal waters. Analytical results from this and other surveys have shown that fish generally contain low levels of mercury, refuting the adverse publicity implying that all fish are high in mercury. A computerized data system has been developed to handle information from these surveys. The results will be used to (1) assess changes in microconstituent levels in the future, (2) provide factual scientific evidence on microconstituents in seafoods, and (3) based on known quantities of seafoods consumed and microconstituent levels, provide evidence to the Food and Drug Administration on the establishment of guidelines on trace elements.

Results from the program can materially reduce industry costs by pointing out areas which should not be fished, reduce the quantity of fish which must be tested, and reduce storage costs while awaiting testing.

Pollution Control

A major contribution of the Division to the fishing industry and to the Environmental Protection Agency (EPA) is in providing technical expertise and treatment data to assist in the formulation of sound effluent guidelines for seafood processors and to avoid treatment inadequacies and excessive economic burdens. NMFS and EPA are working toward the common goal of workable effluent guidelines with adequate environmental protection.

Inspection Services and Process Hazards

Fishery products inspection and certification services were carried out at 38 processing establishments and 13 lot inspection stations located in 18 States. Fishmeal inspection was conducted at 19 fishmeal processing establishments. The services were conducted mostly under contracts requested by industry to ensure that the products examined met U.S. grade standards for processed fishery products, and that the products were prepared under suitable, hygienic conditions. In 1973, approximately 321 million pounds of seafood products were inspected and certified.

During 1973, the inspection service developed and implemented, at the fishmeal industry's request, an inspection program for fishmeal plants and products for the control of *Salmonella*. The program is conducted on a fee-for-service basis. Nineteen plants had contracted for this service by the year's end.

An interim specification for minced fish blocks was developed and implemented to assist industry in assuring that raw material, i.e., fish blocks composed of fish flesh separated mechanically from skin and bone material for use in manufacturing fish sticks and fish portions, is of suitable quality. In this regard detailed studies were started to develop standards for grades of minced fish blocks which, when complete, will replace the interim specification.

A consumer and trade education program was initiated to familiarize the consumer and trade member with the value of the USDC Fishery Products Inspection Service, the meaning of the USDC inspection marks and Federal grade standards for fishery products, the use of quality control in Federally inspected plants, and certain widely used fishery products. The educational effort was started by the publication of five one-page releases called "Food Fish Facts" and a brochure entitled "Protection Through Inspection." These were distributed primarily to food editors, institutional purchasers, consumer groups, and wholesale buyers.

A program was initiated on the nomenclature of fishery products by publication in the *Federal Register* of a Statement of Interest and Intent. If adopted, it will clarify and refine the policy and procedures that govern the nomenclature of fish, shellfish, and their products for purposes of marketing and labeling. The standardization of such nomenclature will alleviate problems which constitute an obstacle to the development of underutilized fishery resources, and thereby limit opportunities for alleviating shortages associated with traditional fisheries. It will result in the

orderly market development of many nutritious species now carrying aesthetically objectionable common names that severely limit their marketability.

In the area of process hazards, research has been directed toward determining if N-nitrosamines (potent carcinogens) constitute a problem in smoked fishery products. Results to date show no nitrosamine hazard exists in these products. In addition, microbiologists are investigating the occurrence and health significance of *Vibrio para-haemolyticus* in fishery products and inspecting fishmeal for *Salmonella*.

RESOURCE MANAGEMENT

The Office of Resource Management plans, develops, and evaluates programs to improve State and Federal management of fisheries and marine mammal resources and their environments. In carrying out its function, the Office of Resource Management works cooperatively with a number of other agencies. These include the Environmental Protection Agency; Department of State; Coast Guard; Office of Sea Grant; Corps of Engineers; Bureau of Sport Fisheries and Wildlife; Bureau of Customs; fisheries agencies of the 50 States and Puerto Rico, the Virgin Islands, Guam, and American Samoa; the Atlantic States Marine Fisheries Commission, the Gulf States Marine Fisheries Commission, and the Pacific Marine Fisheries Commission; the Council of State Governments; and a number of prominent conservation organizations such as the American Fisheries Society, Sport Fishing Institute, National Wildlife Federation, Wildlife Management Institute, and The Wildlife Society.

In 1973, the Office of Resource Management administered the following major programs through each of the five regional offices: Water Resources Management, Enforcement and Surveillance, State-Federal Relationships, and Marine Mammal Administration. In addition, the Pribilof Islands Management Program and the Columbia River Fisheries Development Program are administered through the Northeast Region.

WATER RESOURCES MANAGEMENT DIVISION

The primary objectives of the Water Resources Management Program are to conserve, protect, and enhance the marine, estuarine, and certain anadromous and inland habitats supporting significant commercial and marine sport fisheries. Another major objective is to carry out a program to restore the anadromous fish runs of the Columbia River that have been disrupted by construction of dams and other water projects.

The first objective is approached by consolidating NMFS expertise and applying it to systematic participation in environmental decision-making in cooperation with Federal and State agencies involved in water resources planning and development. Such action is effected through coordination and liaison between agencies, institutions, and individuals directly concerned with conflicts between the need for development and the need for conservation. Staff personnel provide technical assistance to various committees working with discrete water resource problems and supply inputs into comprehensive water-use studies of national and regional significance. Efforts to prevent or reduce damage to the resource are promoted by reviewing and reporting on dredged and fill proposals, Environmental Protection Agency waste discharge and ocean dumping permits, Corps of Engineers permits for construction in navigable waters, environmental impact statements, Atomic Energy Commission and Federal Power Commission license applications, and proposed water development projects of other public and private construction agencies under Federal permit or license.

Major improvements in effectiveness of response were made in 1973:

(1) To assure proper and efficient liaison and participation, memoranda of understanding were pursued with other agencies. Such a memorandum was signed this year with the U.S. Forest Service. Initiatives which may lead to other memoranda of understanding were begun with the Environmental Protection Agency, Bureau of Sport Fisheries and Wildlife, Bureau of Land Management, and Corps of Engineers. A memorandum of understanding is also under discussion between various States and concerned Federal agencies regarding dredging and dumping in Long Island Sound and Rhode Island Sound.

(2) Program assistance to the Council on Environmental Quality in preparing its policy study on offshore floating nuclear power plants. NMFS scientists were principal authors of the chapter "Direct Environmental Effects of Offshore Nuclear Power Plants," which includes information on potential environmental impacts of construction, operation, decommissioning, internal nuclear accidents, and accidental radioactive releases. NMFS also provided inputs to the living marine resources section of the chapter on environmental description.

(3) The program staff sought new opportunities to be included in early planning actitivies. In the Southwest, our personnel participated in interagency studies aimed at developing design criteria for a fish screening device to be constructed on the proposed Delta Peripheral Canal. NMFS staff personnel in Alaska worked on early planning for monitoring Trans-Alaska pipeline oil

tanker routes, resource assessments for offshore areas where petroleum lease sales are anticipated, and future use of explosives in marine seismic programs. Major efforts also went into continued participation in comprehensive river basin studies.

(4) NMFS staff personnel worked with other fish and wildlife agencies and the Southern California Edison Company to develop a monitoring program for two additional nuclear power units at the Company's San Onofre plant, and to develop pre- and post-operational monitoring programs for its Long Beach generating plant.

COLUMBIA RIVER FISHERIES PROGRAM

In 1973, the runs of spring and fall chinook returning to the Columbia River were good. Large returns to hatcheries and high incidence of marked fish indicated a high contribution of hatchery fish to these runs. The gill net fishery landings for fall chinook were the highest in the past 25 years, over 287,000 fish. The coho run in the Columbia River was only average, but ocean catches were good. The newly established fall chinook run into the Willamette River continued its upward trend with a record count of over 22,000 fish.

Work on hatchery pollution abatement was initiated by contracting with a consulting firm to study hatchery effluents and recommend corrective measures for 20 Columbia River Fishery Program hatcheries.

A hatchery visitors' questionnaire was developed and distributed for the purpose of obtaining an estimate of the recreational value of salmon and steelhead hatcheries. The Columbia River Program hatcheries have proved to be valuable educational and recreational assets, and in the future these values will be included in economic studies.

The program participated in multiagency activities under guidance of the Pacific Northwest River Basin Commission in connection with the Coordinated Comprehensive Joint Plan and in the Columbia River and Tributaries Study of the Corps of Engineers. Outputs in such planning efforts include fish resource development plans, participation in public information workshops, and information from which to evaluate effects of changes in Columbia River hydroelectric power peaking.

NMFS worked with the Bureau of Sport Fisheries and Wildlife and fish and game agencies of the States of Idaho, Oregon, and Washington to update "A Special Report on the Lower Snake River Dams." The original report issued September 1972 justified an expenditure of $33,646,000 for new hatcheries for chinook salmon and steelhead trout. The report is under consideration by the Corps of Engineers.

Program personnel participated in the formulation and review of systems to reduce dissolved gases in Columbia River water. Fish facilities for the proposed second powerhouse at Bonneville Dam, juvenile and adult traps at Lower Granite Dam on the Snake River, protective facilities for the Peripheral Canal of the Sacramento-San Joaquin Delta, and facilities for the proposed Chena River project in Alaska were planned in cooperation with other involved agencies.

Significant accomplishments of 1973 include:

(1) Procedures were proposed for economic evaluation of fish by preparing a report on "Partial Net Economic Values for Salmon and Steelhead." These values provide an economic basis for monetary evaluation of fish resources for investment decisions.

(2) NMFS assisted in the instream flow study of Middle Snake River conducted by five Federal Departments and 24 State organizations. Five levels of river flows were examined by nine scientific teams for white-water and jet boating, sport fishing, and aquatic habitat for resident and anadromous fish and their food organisms.

(3) The State of Idaho, with NMFS funding, rescreened a major irrigation diversion on the Salmon River. Tests indicate approximately one-half million juvenile fish will be saved annually by this installation.

(4) Production of the 21 salmon and steelhead hatcheries funded by NMFS and operated by the Bureau of Sport Fisheries and Wildlife and the State fish and game agencies of Washington and Oregon, was as follows:

	Numbers	Pounds
Fall chinook salmon	68,493,000	767,000
Spring chinook salmon	4,401,000	307,000
Coho salmon	20,060,000	1,149,000
Chum salmon	564,000	1,400
Steelhead trout	2,249,000	364,000
Sea run cutthroat	27,000	9,000
Total	95,794,000	2,597,400

STATE-FEDERAL RELATIONSHIPS

The Office of State-Federal Relationships seeks to encourage cooperation among the States and the Federal Government to develop comprehensive management plans for fisheries over resource-wide ranges of distribution, rather than on a fragmented State-by-State basis. Considerable progress was made in this new program during 1973. Positive achievements have resulted from sound program concepts and philosophies. Moreoever, these accomplishments reflect a strengthening State and Federal conviction that the most effective way to resolve the root problems of our important domestic fisheries is through cooperative, intergovernmental action.

An increasing cooperative spirit of participation is being demonstrated. This is particularly significant in view of the many biological, economic, social, legal and political consequences that must be considered when taking and implementing innovative fisheries management decisions.

While an integral part of the State-Federal Fisheries Management Program, the Grant-in-Aid Program, which includes the Commercial Fisheries Research and Development Act (P.L. 88-309 as amended) and the Anadromous Fish Conservation Act (P.L. 80-304 as amended), is administered separately.

Specifically, the following significant program accomplishments were made in 1973.

(1) The Administration's "High Seas Fisheries Conservation Act of 1973," a major legislative step toward full implementation of the State-Federal Fisheries Management Program, was introduced in the Congress early in the year.

(2) Program funds in the amount of $166,000 were provided to expedite cooperative management plan development for Dungeness crab ($81,000), Gulf of Maine shrimp ($45,000), and South Atlantic shrimp ($40,000). Uniform mesh regulations for the harvest of shrimp resources in the Gulf of Maine were jointly adopted by the States of Maine, New Hampshire, and Massachusetts. Initial recommendations for establishing an "orderly" coast-wide fishery for Dungeness crab will be made before the 1974 fall and winter harvest period.

(3) Approximately 50 projects were completed under the Federal grant-in-aid program, including rehabilitation of hurricane-damaged oyster grounds in North Carolina, the construction of a striped bass hatchery in Alabama, the construction of salmon spawning channels in Washington, and experiments in mariculture techniques for certain marine species. Additionally, 53 scientific publications resulted from research conducted under the program.

ENFORCEMENT AND SURVEILLANCE

Fisheries enforcement involves the monitoring of foreign fisheries operations to ensure compliance with provisions of 21 international treaties and agreements. It guards against incursion into the U.S. territorial waters and Contiguous Fisheries Zone and ensures the observance of domestic fisheries regulations. To a great extent, this program is planned and coordinated through cooperative working agreements with the U.S. Coast Guard. Aerial and surface patrols and required facilities are provided by the Coast Guard, while enforcement and fisheries expertise are furnished by NMFS Marine Enforcement Agents.

Surveillance affords knowledge of the innovations and trends in foreign fisheries operations, determines estimated catch by quantity and species, and permits accurate and timely assessment of fleet composition and movement. This information is employed in formulating U.S. fisheries policy, and establishes a sound basis for fisheries negotiations with other countries.

Enforcement of The Marine Mammal Act of 1972 and regulations adopted under it are a major concern in 1973. It required enforcement of provisions concerning the taking and importation of certain marine mammal resources and related products. The enforcement of Federal statutes regarding the possession and transportation of illegally taken fish and wildlife and the development of regulations authorized by various international compacts are additional responsibilities of the Division. Cooperative working agreements with State and other Federal agencies have been established whenever such arrangements facilitated achieving program objectives.

Regional enforcement and surveillance emphasis is directed toward defined problem areas. Numerous foreign fisheries violations of the U.S. jurisdictional waters off the coast of Alaska stress the need for constant aerial and surface patrols in that region. Protection of salmon migrations under terms of international agreements is a primary concern in the Northwest, while major efforts in the Southwest are expended toward gaining compliance with yellowfin tuna regulations. The Southeast region is actively concerned with enforcement of Marine Mammal Act provisions; also, this region will administer the implementation of the Offshore Shrimp Fisheries Act regulations, which involve United States fishermen fishing in waters off the coast of Brazil. International agreements in the Northeast area require increased attention to assure compliance with annual and species quotas, other regulations, and recent restrictions regarding the taking of American lobsters by foreign fishermen on the United States continental shelf.

Accomplishments of the Enforcement and Surveillance Division for 1973 include:

(1) Enforcement actions involving 70 vessels in violation of fisheries compacts or regulations, resulting in penalties exceeding $900,000.

(2) Surveillance activities accounting for 6,842 individual foreign fisheries vessel sightings and 432 boardings; the outcome of 1,096 days and 204,000 miles of surface patrol and 3,200 hours and 503,000 miles of aerial patrols.

(3) Formal enforcement action on 29 cases involving marine mammals and related products, including seizure of seven porpoises and 9,000 whale teeth held in violation of the Marine Mammal Protection Act and the Endangered Species Action provisions.

MARINE MAMMAL ADMINISTRATION

The Marine Mammal Program involves the administration of the Marine Mammal Act of 1972 with respect to whales, porpoises, seals, and sea lions. This Act, with certain exceptions, places an immediate moratorium on the taking or importing of marine mammals and marine mammal products. Responsibilities include recommendations regarding waivers of the moratorium; issuance of exemption permits; enforcement of the provisions of the Act; participation in negotiations with other nations for the protection and conservation of marine mammals; and Federal cooperation with States in administering the Act.

The Director of NMFS was authorized by the Secretary and the Administrator of NOAA to grant at his discretion exemptions for taking or importing marine mammals and marine mammal products to any person by reason of a showing that that person would suffer undue economic hardship if such taking or importing were prohibited. This authority, and any exemptions granted thereunder, expired as of October 21, 1973. The second major discretionary exception to the moratorium involves the granting of permits for scientific research and public display. The determination to grant or deny a permit application involves a thorough review of the application by NMFS scientists, NMFS regional officials, and the Marine Mammal Commission, and inspection of the applicant's facilities on public display applications. Public comments are solicited and considered on each application.

Tuna/porpoise research which began in 1970 has been accelerated as a result of passage of the Marine Mammal Protection Act. Gear, fishing techniques, and population dynamics studies are all aimed at reducing the mortality and serious injury rates of porpoises to as near zero as possible when the 24-month adjustment period allowed in the Act terminates on October 20, 1974.

NMFS has closely cooperated with coastal States to more effectively administer the Act and to date NMFS entered into contracts for enforcement of the Act with 10 States. A policy has been developed under the provision of the Act for the handling of beached and stranded marine mammals by State employees and officials. The Act sets forth a procedure under which the States can assume a more active role in the management of marine mammals within their boundaries by submitting State laws and management programs to NMFS for review and approval.

Accomplishments of the Marine Mammal Conservation Program in 1973:

(1) Regulations were promulgated governing: (a) the taking and importation of marine mammals, and (b) incidental taking of marine mammals in the course of tuna purse seining operations.

(2) Sixty applications to obtain marine mammals under the undue economic hardship provision of the Act were processed. Twenty-two exemptions were granted, of which 14 were for scientific research, six for public display, one for personal subsistence, and one for commercial importation of seal skins. Forty-six applications for scientific research and public display permits were reviewed, 22 of which were forwarded to the Marine Mammal Commission for consideration. The balance are being reviewed or need additional information from the applicant.

(3) The following reports and studies were prepared and submitted to Congress as required by the Act: (a) Secretary of Commerce's report on Administration of the Marine Mammal Protection Act, from December 21, 1972, to June 21, 1973; (b) Report of the Secretaries of State, Commerce, and the Interior on the efforts to initiate international action for the protection of all marine mammals and the current status of international protection for marine mammals; (c) Study of the status and trends of the North Pacific fur seals under the jurisdiction of the United States; (d) Study of the comparison of the provisions for the Marine Mammal Protection Act and the North Pacific Fur Seal Convention to determine what modifications, if any, should be made to the provisions of the Convention, the Act, or both.

(4) Administrative policies were formulated and published in the Federal Register on the following subjects: (a) Intent to issue economic hardship exemptions; (b) Issuance of Letters of Exemption for taking live animals for display purposes; (c) Instructions for filing applications for economic hardship exemption; (d) Import registration procedure; (e) Filing applications regarding waivers of moratoriums; (f) Intent to consider permits to take or import marine mammals for public display and scientific research; (g) Instructions for preparing applications for permits to take or import marine mammals; and (h) Policy regarding hearings on applications.

PRIBILOF ISLANDS MANAGEMENT PROGRAM

The Fur Seal Act of 1966 (80 Stat. 1091) charges the Secretary of Commerce with the management of the Northern fur seal and administration of the Pribilof Islands. Each summer the National Marine Fisheries Service supervises the harvest of male fur seals surplus to the needs of the herds on the Pribilof Islands, Alaska.

Research and management of the herd is conducted through terms of the Interim Convention on Conservation of North Pacific Fur Seals with the governments of Canada, Japan, the Union of Soviet Socialist Republics, and the United States participating. The objective is to achieve maximum sustainable production of the resources. Under international protection and rational management the Alaska fur seal herd has increased from the low point of about 200,000 animals in 1912 to its present level of 1.3 million animals.

The Aleuts of the Pribilof Islands will soon be embarking upon new roles as land owners and private entrepreneurs as provisions of the Alaska Native Claims Settlement Act become implemented. The complex structure of the Act has required St. Paul and St. George Islands residents to form village corporations charged with selection of 253,440 acres of land and administration of thousands of dollars. Owing to the time limitations placed in the Act relating to land selection, the village corporations have instigated crash training programs where they have been learning map reading, Bureau of Land Management regulations, sources of potential natural resources, the government process, and many technical subjects.

The Aleuts of the Pribilof Islands are planning the use to be made of the surplus government buildings they will receive and pondering the many problems inherent with home ownership. The largest portion of their land entitlement is off-island, i.e., lands along the Aleutian Chain. Deep study is necessary to ascertain the lands that could prove to have the greatest potential. Harbor sites could control a large block of the fishing industry as well as inland business enterprise and mineral development.

The village corporations have to furnish plans, complete with budgets, to the regional corporation for approval before they can receive their prorated share of the financial settlement. Their planning includes small business development, tourism expansion, building programs, harbor utilization, fishing industry in a cooperative effort with other villages, and stock investments.

The corporations are formed as profit making; under the laws of the State of Alaska, the energetic young leaders of the Pribilofs intend that they do indeed make a profit.

A major achievement for the year was the agreement reached by the four member countries of the North Pacific Fur Seal Commission to a United States proposal to set St. George Island aside as a research control area. No commercial harvesting will take place on the Island during the long-term research project which will compare changes in the populations of a harvested island (St. Paul) to that of the unharvested population on St. George. The

research program will attempt to identify the principal factors governing the population level and will include high-seas research in the Bering Sea area in the principal fur seal feeding areas.

PUBLICATIONS

NMFS staff members publish their work both in series of publications bearing the NMFS imprimatur and in scholarly journals and technical publications. A list, arranged by author, of these publications in calendar year 1973 appears later in this report.

The series issued directly under the auspices of NMFS in calendar year 1973 were:

Current Fisheries Statistics

These publications are issued monthly, quarterly, or annually by States, regions, or larger areas. In calendar year 1973, 272 numbers (2,206 pages) were issued.

Data Report

Issued in microfiche form, the Data Reports are available as microfiches or as hard copies from the U.S. Department of Commerce, National Technical Information Service. Prices vary according to length. In calendar year 1973, 6 Data Reports (1,004 pages, 19 microfiche) were issued.

Fishery Bulletin

This publication, which originated in 1881, is issued quarterly. It is available from the Superintendent of Documents.

Four numbers of Volume 71 were issued in calendar year 1973. They contained 88 papers and an index, totalling 1,132 pages.

Fishery Facts

This series was established in 1971; 2 numbers (42 pages) were issued in calendar year 1973.

Fishery Market Development Series

This series contains popular educational publications on care, preparation, purchase, and nutrition of fishery products. They are for sale by the Superintendent of Documents. During calendar year 1973, 9 Food Fish Facts, 3 folders on fisheries, 1 booklet on recipes, and 3 four-color posters of fishes of the United States were issued.

Marine Fisheries Abstracts

Issued monthly, this publication (until March 1973, called Commercial Fisheries Abstracts) has appeared since 1948. Calendar year 1973 had 12 numbers (536 pages). The publication is available for purchase from the Superintendent of Documents.

Marine Fisheries Review

In calendar year 1973, the monthly periodical Marine Fisheries Review had 12 numbers (536 pages). The publication is available for purchase from the Superintendent of Documents.

Market News

The several Market News offices issue current statistical information on a daily basis. In calendar year 1973, the daily reports numbered 1,104 (3,115 pages).

Current Economic Analysis

There are three subseries in which prices, production, imports, exports, and inventories of fishery products are analyzed: Food Fish Market Review and Outlook (2 numbers, 124 pages in calendar year 1973), Industrial Fish Market Review and Outlook (2 numbers, 72 pages), and Shellfish Market Review and Outlook (3 numbers, 152 pages). Until July 1973, these subseries were called Situation and Outlook reports.

Miscellaneous Publications

Report of the National Marine Fisheries Service for Calendar Years 1970 and 1971 (132 pages) and Report of the National Marine Fisheries Service for Calendar Year 1972 (68 pages) were issued in calendar year 1973.

NOAA Technical Memorandum NMFS

Three reports (75 pages) were issued in this series in calendar year 1974. The series is available from the National Technical Information Service.

NOAA Technical Report NMFS CIRC

In calendar year 1973, there were 13 (656 pages) of these reports issued; in addition, Vol. 7 (7 pages plus 145 charts) of the EASTROPAC Atlas (Circular 330) was issued. These publications are available for purchase from the Superintendent of Documents.

NOAA Technical Report NMFS SSRF

In the calendar year, 10 (345 pages) of these publications were issued. They are available for purchase from the Superintendent of Documents.

Statistical Digest

No publication in this series was issued during calendar year 1973.

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